

Infrared Observations of Solar System Objects

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Strategy

This program is our ongoing groundbased infrared studies of Solar System objects. This is a broadbased program that includes collaboration with scientists at other institutes and several graduate students at the University of Arizona. Our overall objective is to study the spectral and physical properties of small Solar System bodies. Our work spans the entire Solar System from a study of the mineralogy of Mercury, to several studies of asteroids, and to studies of Triton, Pluto, and Charon. From these studies we hope to understand better the origin and evolution of these bodies and how they fit into the context of the origin and evolution of the Solar System as a whole.

Progress and Accomplishments

In the last year, we have submitted for publication 5 papers (2 published and 2 in press). We also expect to submit 3 papers in the near future on the diameter and thermal properties of Vesta, a book chapter on asteroid studies, and on the near IR spectrum and composition of Mars' satellite Deimos. We have had several successful telescope runs in the past few months on the visual and near IR spectra of dark asteroids and satellites and are presently reducing these data.

Projected Accomplishments

Over the next year our work will include: Continued studies of dark asteroids and satellites, study the distribution of water and other low-temperature materials in the Solar System, study the nature of shocked material on asteroid surfaces, study the relationship between asteroids and comets, and make more extensive correlation of all of these observations with laboratory spectra of meteorites.

Publications

Lebofsky *et al.* (1990), Jones *et al.* (1990), Marcialis and Lebofsky (1991), Marcialis *et al.* (1991), Gaffey *et al.* (1991).

Pitfalls to direct comparison of cometary and asteroidal light curves, R. L. Marcialis and L. A. Lebofsky, submitted to *Astron. J.* 1990.

The nature of low albedo asteroids from 3- μ m spectrophotometry, L. A. Lebofsky, T. D. Jones, P. D. Owensby, M. A. Feierberg, and G. J. Consolmagno. *Icarus* **83**, 12-26 (1990).

The composition and origin of the C, P, and D asteroids: Water as a tracer of thermal evolution in the outer belt, T. D. Jones, L. A. Lebofsky, J. S. Lewis, and M. S. Marley. *Icarus* **88**, 172-192 (1990).

CVF spectroscopy of Pluto: Correlation of composition with albedo, R. L. Marcialis and L. A. Lebofsky. *Icarus*, in press, 1991.

The albedos of Pluto and Charon: Wavelength dependence, R. L. Marcialis, L. A. Lebofsky, and E. F. Tedesco. Submitted to *Icarus*, 1991.

Asteroid surface compositions from earthbased spectroscopy, M. J. Gaffey, L. A. Lebofsky, M. Nelson, and T. D. Jones, in press, 1991.